Task Force Eyes New Measures Of Mississippi River Nutrient Reductions

An EPA-led task force on reducing nutrient pollution in the Mississippi River Basin and Gulf of Mexico is considering diversifying its progress indicators beyond just measuring the size of the Gulf's so-called dead zone and has identified six projects and programs that could serve as models for reducing nutrient pollution throughout the watershed.

Darrell Brown, national program manager for EPA's National Estuary Program and chair of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, told a National Academy of Sciences (NAS) panel Dec. 14 that the task force is focusing its attention on developing specific actions and focus areas that can be undertaken to reduce the overall nutrient load in the basin, and is looking at actions taken by a number of states and other stakeholders as models for those actions.

Excessive levels of nutrients such as nitrogen and phosphorous result in diminished oxygen levels in waters because they increase algal growth -- a process known as eutrophication -- which eventually lowers oxygen levels. The excess nutrients come from both point sources like wastewater treatment plants and nonpoint sources like stormwater runoff from agricultural land where nutrient-rich fertilizers are used.

In 2008 the task force -- comprised of representatives from 10 states, EPA, and seven other federal agencies -- unveiled an updated action plan for reducing excess nutrients in the basin, laying out specific steps that need to be accomplished to meet the goal of reducing the size and impact of the Gulf hypoxic zone and improving water quality in the Basin. The plan focuses in on identifying responsibility for nutrient-reduction plans, with federal agencies, rather than the states, responsible for most actions, and it places an emphasis on watershed-wide reduction of nutrients.

Speaking before the NAS Committee on Clean Water Act Implementation Across the Mississippi River Basin, Brown said the issue of accountability and specificity in terms of what actions to undertake has long been a problem not just in the Mississippi River but in other watersheds with nutrient pollution. "This has been on the table for a number of years," he said. "When developing a new action plan, we're looking at greater accountability, greater specificity in what we hope to accomplish."

EPA asked NAS to form the committee to develop recommendations for combating nutrient pollution in the Mississippi River Basin.

Currently, progress in reducing nutrient pollution in the Basin is tied to reducing the size of the Gulf hypoxic zone, with a goal of reducing the five-year running average size of the zone to less than 5,000 square kilometers (km2). The current five-year average is 14,644 km2.

Task Force Weighs Other Measures

But Brown said the task force is considering other measures because nutrient pollution efforts may take a long time to affect the dead zone. These other indicators, such as erosion control

measures and additional wetlands created, can indicate progress that may not be evident by the size of the zone he said. “This is very much a work in progress,” Brown said. “These may be indicators for future annual reports.”

Brown also said there were six projects and programs that the task force is specifically looking at as success stories that it may recommend as part of a broader action plan in the future.

These include an EPA program to use dredged material to create marshland and nutrient uptake in the Louisiana Delta; the Iowa Drainage and Wetlands Landscape Systems Initiative, which redesigns the Des Moines Lobe agricultural drainage network to include wetlands; a nutrient reduction plan issued by Mississippi as part of the task force’s 2008 action plan, which Brown says could serve as a model for other states; strategic large-scale flood plain reintroduction in the Mississippi River watershed; the Great Miami River Watershed Water Quality Credit Trading Program, which creates market-based incentives to reduce nutrient pollution from nonpoint sources; and the U.S. Department of Agriculture’s Conservation Reserve Program, which pays farmers who take fragile land out of production and plant grasses or trees or restore wetlands.

“These are six projects out of 15 to 20 different projects that we looked at that will provide specific actions for nutrient reduction,” Brown said. “The proposals advocate the use of advanced tools and technologies to address the [object of] the action plan.”

Using the combined suite of nutrient reductions strategies as outlined in the six programs each provide a certain benefit for the cost incurred, Brown said. But what remains uncertain is which technique is the most cost-effective for any given area in terms of nutrient reduction. Further, taking a large problem like reducing the hypoxic zone and dividing the burden appropriately between the contributing watersheds is a daunting task, he said.

“Targeting is a tough word and it’s a tough issue, and we’re wrestling with that . . . in the task force,” Brown said, referring to the task of taking an overall, big-picture reduction like the 45 percent reduction in the Gulf hypoxic zone by 2015, as was recommended by the Science Advisory Board, and breaking it down into sub-basin-sized obligations. “It’s fraught with scientific difficulties, political difficulties, and legal difficulties, but we are starting those discussions of how to apportion that to a smaller basin.”

Members Analyzing Nutrient Data

Brown said the task force’s members are interested in bringing together a number of different modeling criteria to provide a sharper picture of where nutrient pollution is coming from and where reduction strategies can be most gainfully deployed.

The Spatially Referenced Regressions on Watershed Attributes (SPARROW) model developed by the U.S. Geological Survey (USGS) helps predict the sources of nutrient pollution over a large physical area. But the model has been controversial with some states who believe some of the data is suspect and unfairly targets them for nutrient pollution.

Brown acknowledged the data gaps and lack of data in SPARROW for some areas of the Basin, but told the NAS panel that if those gaps can be addressed, perhaps through other models, the task force and relevant agencies will have a tool that can better indicate progress on nutrient reduction.

One of the models that may prove useful is the Conservation Effects Assessment Project, a model that quantifies how much benefit is generated for a watershed after the creation of a wetland, either from converted farmland or other uses. The model does this by quantifying the ecosystem services derived from the wetland and quantifying the nutrients that are trapped in the wetland that otherwise would have flowed downriver, including “before” and “after” figures, according to USGS. -- *John Heltman*